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PROGRAM

Arkansas Academy of Science

Sixty-Third Annual Meeting

HENDRIX COLLEGE
Conway, Arkansas

Meeting concurrently with sessions of:

The Collegiate Academy of Science

Friday, 6 April

SENIOR AND COLLEGIATE ACADEMIES -- Registration

SENIOR ACADEMY -- Executive Board Meeting

COLLEGIATE BUSINESS MEETING I

SENIOR ACADEMY -- First General Business Meeting

WESTINGHOUSE SCIENCE TALENT SEARCH AWARDS

Lunch

SENIOR AND COLLEGIATE ACADEMIES -- Registration

SENIOR AND COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:

Chemistry
Mathematics and Physics
General Physiology/Invertebrate Zoology
Environmental and Engineering Sciences I
Science Education

ARKANSAS BIOLOGICAL CURRICULUM DEVELOPMENT
PLANNING

ENDANGERED SPECIES TECHNICAL COMMITTEE

ENDANGERED AND THREATENED PLANT SPECIES IN
ARKANSAS

SENIOR AND COLLEGIATE ACADEMIES -- Banquet

SPEAKER: Governor Bill Clinton
"Utilization of Arkansas Scientists"

Saturday, 7 April

SENIOR AND COLLEGIATE ACADEMIES -- Registration

SENIOR AND COLLEGIATE ACADEMIES -- Papers [Concurrent Sessions]:

Vertebrate Zoology
Botany
Environmental and Engineering Sciences II
Anthropology/Archeology
Geology

COLLEGIATE BUSINESS MEETING II

SENIOR ACADEMY -- Second General Business Meeting

SECTION PROGRAMS

[Papers marked with * are presentations by Collegiate Academy members]

CHEMISTRY SECTION

Chairman: Alex R. Nisbet

*SYNTHESIS OF CALLISTEPHIN CHLORIDE.

Johnny E. Brian and Thomas E. Goodwin, Hendrix College

*A RADIOIMMUNOASSAY FOR PHOSPHOGLUCOSE ISOMERASE AND ITS INITIAL UTILIZATION IN DETECTING CROSS REACTIVE MATERIAL IN VARIANT FORMS OF PHOSPHOGLUCOSE ISOMERASE.

Roy S. Jones, K. Purdy and Robert W. Gracy, Hendrix College and North Texas State University

*EXPERIMENTAL PROCEDURE FOR THE DETERMINATION OF TRACE-LEVEL URANIUM IN ROCK AND LIQUID SAMPLES USING ARGON PLASMA SPECTROSCOPY.

Richard A. Roberts, Hendrix College and Joe R. Trimm, Tennessee Valley Authority

PYRAZOLE AND PYRAZOLATO COMPLEXES OF PLATINUM(II).

W. C. Deese, M. L. Howe, and D. A. Johnson, University of Arkansas at Fayetteville and Christian Brothers College

THE SYNTHESIS OF HEX-1-ENOPYRAN-3-ULOSES.

Thomas A. Goodwin and Richard Jackson, Hendrix College

THE REDUCTION OF TOSYLHYDRAZONES BY 9-BBN.

Dominic T. C. Yang, Jim W. Purser, and Chris M. Moser, University of Arkansas at Little Rock

SYNTHESIS OF A SERIES OF 2,5- AND 5,6-DIHALONICOTINIC ACIDS.

Frank L. Setliff, University of Arkansas at Little Rock

MATHEMATICS AND PHYSICS SECTION

Chairman: Robert Eslinger

*UNIFORM LIMITS OF STEP FUNCTIONS.

Agnes L. Tulio, Hendrix College

*THE KERNEL OF THE LAPLACE TRANSFORM.

David Sutherland, Hendrix College

*CHARACTERIZATION OF CONVEX SETS.

Lisa M. Orton, Hendrix College

*HIGHER ORDER SYMMETRIC DERIVATIVES.

Gene Weber, Hendrix College

GENERAL PHYSIOLOGY/INVERTEBRATE ZOOLOGY SECTION

Chairman: Dale V. Ferguson

THE EFFECT OF TURF FUNGICIDES ON EARTHWORMS.

J. H. Roark and J. L. Dale, University of Arkansas at Fayetteville

CAVE FAUNA OF ARKANSAS: ADDITIONAL INVERTEBRATE AND VERTEBRATE RECORDS.

Kenneth N. Paige, V. Rick McDaniel and C. Renn Tumison, Arkansas State University

MOLLUSCA OF THE ILLINOIS RIVER, ARKANSAS.

Mark E. Gordon and Arthur V. Brown, University of Arkansas at Fayetteville

TIME COURSE OF PR OF UV-INDUCED CHROMOSOMAL ABERRATIONS AND LETHAL DAMAGE IN S AND G2 XENOPUS CELLS.

Jan Payne and Gaston Griggs, John Brown University

GENIC VARIATION IN WHITE-TAILED DEER FROM ARKANSAS.

Phyllis K. Price, Memphis State University and Michael Cartwright and Mitchell Rogers, Arkansas Game and Fish Commission

ENZYME VARIABILITY IN TWO MEMBERS OF THE VIRILIS GROUP OF DROSOPHILA SPECIES.

William C. Guest, Richard O. Dockins and Virgil Wooten, University of Arkansas at Fayetteville

ELECTROPHORETIC ANALYSIS OF BLOOD SERUM PROTEINS IN THREE SPECIES OF NERODIA (WATER SNAKES).

Phyllis Garnett, University of Arkansas at Little Rock

ANALYSIS OF THE MOTILE APPARATUS OF THE AFLAGELLATE SPERMATOOZON OF MACROSTROMUM TUBUM.

W. Donald Newton and Danny W. Phillips, Arkansas State University

THE ROLE OF THE NATURE CONSERVANCY IN ARKANSAS.

Kenneth Lee Smith, The Nature Conservancy-Arkansas Heritage Program

*COMPUTER APPLICATIONS IN POPULATION GENETICS.

Cassandra Scrimshire, Hendrix College

*DEGENERATING AND REGENERATING INDIRECT FLIGHT MUSCLES OF THE RICE WATER WEEVIL (*LISSORHOPTERUS ORYZOPHILUS*, KUSCHEL): THEIR COMPARISON AND DESCRIPTION.

Beth Haizlip, University of Arkansas at Fayetteville

*ULTRASTRUCTURAL OBSERVATIONS OF THE CERTAIN TOPOGRAPHICAL FEATURES OF LARVAE AND PUPAE OF THE YELLOW JACKET WASP, *VESPULA SQUAMOSA*.

Richard Roller and William R. Bowen, University of Arkansas at Little Rock

*A COMPARISON OF THE LENS PROTEIN PROFILES OF THREE SPECIES OF OZARK SALAMANDERS.

James M. Britton, University of Arkansas at Fayetteville

SMALL ANIMAL WHOLE BODY GAMMA COUNTER - MULTIPLE ADAPTATIONS AND EVALUATIONS.

James T. McVey, John Hunziker, Joseph F. Holson and John F. Young, The National Center for Toxicological Research

IS THE SUPRACHIASMATIC NUCLEUS [SCN] A RHYTHM GENERATOR?

James N. Pasley, Ervin W. Powell and Lawrence E. Scheving, University of Arkansas for Medical Sciences

ENVIRONMENTAL SCIENCE AND ENGINEERING SCIENCES I SECTION

Chairman: John K. Beadles

THE FATE OF RADIONUCLIDES INJECTED INTO LAKE DARDANELLE.

David Chittenden, Arkansas State University

A NOTE OF THE FOOD HABITS OF SELECTED RAPTORS FROM NORTHEASTERN ARKANSAS.

Earl L. Hanebrink, Alan Posey and Keith Sutton, Arkansas State University

ABUNDANCE AND DIVERSITY OF FISH FROM ONE SAMPLING DATE IN THE FLAT BAYOU DRAINAGE AREA, JEFFERSON COUNTY, ARKANSAS.

John D. Rickett, University of Arkansas at Little Rock

ABUNDANCE, DIVERSITY, AND DISTRIBUTION OF BENTHIC MACROINVERTEBRATES IN THE FLAT BAYOU DRAINAGE AREA, JEFFERSON COUNTY, ARKANSAS.

John D. Rickett, University of Arkansas at Little Rock

THE EFFECTS OF CERTAIN AQUATIC PLANTS ON A SIMULATED MUNICIPAL SEWAGE.

Elizabeth Hunt, Pulaski County Health Dept. and Theodore V. Crosley, University of Arkansas at Little Rock

HABITAT DISCRIMINATION WITHIN AN AVIAN OMNIVORE FEEDING GUILD.

Alan F. Posey, Arkansas State University and Douglas James, University of Arkansas at Fayetteville

SOME GROWTH CHARACTERISTICS OF WHITE CRAPPIE, *POMOXIS ANNULARIS RAFINESQUE*, FROM A FLOOD-CREATED POND IN MISSISSIPPI COUNTY, ARKANSAS.

Stephen A. Sewell, Arkansas State University

SCIENCE EDUCATION SECTION

Chairman: Neal Buffalo

SCIENCE WORKSHOP FOR TEACHERS.

Carl T. Rutledge, Southern Arkansas University

EVALUATION OF UNDERGRADUATE COURSES BY INSERVICE BIOLOGY TEACHERS.

Jewel E. Moore and Robert T. Kirkwood, University of Central Arkansas

UNORTHODOX FOOD SOURCES OF PROTEIN.

Karen Johnson, Liz Ellis, Jeanie Russell, Susan Shaffer, and Sue Thompson, University of Central Arkansas

VERTEBRATE ZOOLOGY SECTION

Chairman: John D. Rickett

*A SURVEY OF THE FISHES OF TEN MILE CREEK IN SOUTHEASTERN ARKANSAS.

Carl D. Jeffers and Edmond J. Bacon, University of Arkansas at Monticello

THE RECENT STATUS OF THE SOUTHERN CAVEFISH, *TYPHLICHTHYS SUBTERRANEUS*, IN ARKANSAS.

Ken N. Paige, C. Renn Tumlinson and V. Rick McDaniel, Arkansas State University

DISTRIBUTION OF THE ORNATE BOX TURTLE (*TERRAPENE ORNATA ORNATA*) IN ARKANSAS.

Lawana England, Arkansas Natural Heritage Commission

HABITAT USE IN AN ARBOREAL SNAKE *OPHEODRYS AESTIVUS* (REPTILIA: COLUBRIDAE).

Michael V. Plummer, Harding College

UNUSUAL CONCENTRATION OF SCARLET SNAKES (*CEMOPHORA COCCINEA*) IN VILLAGE CREEK STATE PARK, ARKANSAS.

Keith B. Sutton and V. R. McDaniel, Arkansas State University

A COMPARATIVE PHYSIOLOGICAL STUDY OF DIVING IN THREE SPECIES OF *NERODIA* AND *ELAPHE OBSOLETA* (REPTILIA: SERPENTES).

M. W. Patterson, D. A. Baeyens and C. T. McAllister, University of Arkansas at Little Rock

MODIFICATIONS AND IMPROVEMENTS IN THE FORMAX METHOD OF PREPARING SMALL AVIAN STUDY SPECIMENS.

Martin D. Floyd and Gary A. Heidt, University of Arkansas at Little Rock

A SURVEY OF THE BIRDS OF VILLAGE CREEK STATE PARK, ARKANSAS.

Keith B. Sutton, Arkansas State University

HOVERING FLIGHT IN RED-TAILED HAWKS (*BUTEO JAMAICENSIS*).

Norman Lavers, Arkansas State University

UNUSUAL RESULTS FROM PELLET ANALYSIS OF THE AMERICAN BARN OWL (*TYTO ALBA PRATINCOLA*).

Chris T. McAllister, Kenneth N. Paige and C. Renn Tumlinson, Arkansas State University

STATUS OF ENDANGERED BATS (*MYOTIS SODALIS*, *M. GRISESCENS*, *PLECOTUS TOWNSENDII* *INGENS*) IN ARKANSAS.

John J. Cassidy and Gary G. O'Hagen, Memphis State University

OCCURRENCE OF THE PLAINS HARVEST MOUSE IN ARKANSAS.

Douglas James, John A. Sealander, and Jeffrey J. Short, University of Arkansas at Fayetteville

STATUS OF THE RED-COCKADED WOODPECKER AT THE FELSENTHAL NATIONAL WILDLIFE REFUGE IN ARKANSAS.

Douglas James and Fred L. Burnside, University of Arkansas at Fayetteville

AGE AND HUDDLING AS DETERMINANTS OF METABOLIC RATE IN GRASSHOPPER MICE (*ONYCHOMYS LEUCOGASTER*).

Meredith Bailey, Dennis Baeyens, and Lana Mann, University of Arkansas at Little Rock

A MORPHOLOGICAL INVESTIGATION OF HARVEST MICE, *REITHRODONTOMYS*, FROM ARKANSAS.

John C. Huggins and V. Rick McDaniel, Arkansas State University

MATURATION AND FECUNDITY OF REDEAR SUNFISH.

James C. Adams and Raj V. Kilambi, University of Arkansas at Fayetteville

APPLICATION OF CHRONOBIOLOGICAL PRINCIPLES TO CHEMOTHERAPY.

Lawrence E. Scheving, University of Arkansas for Medical Sciences

BOTANY SECTION

Chairman: Robert Kirkwood

THE FRESHWATER ALGAE OF ARKANSAS III: FURTHER ADDITIONS.

Richard L. Meyer, University of Arkansas at Fayetteville

THREE SPECIES OF *TRYPETHELIUM* NEW TO ARKANSAS.

George T. Johnson, University of Arkansas at Fayetteville

ARKANSAS LICHENS I.

Jewel E. Moore, University of Central Arkansas

***ULTRASTRUCTURAL OBSERVATIONS OF A FLORIDEAN RED ALGA.**

Rosemary Rosell and William R. Bowen, University of Arkansas at Little Rock

***ULTRASTRUCTURAL OBSERVATIONS ON THE PRESENCE OF A FIBER-LIKE INCLUSION IN CERTAIN LEAF CELLS OF THE TRIFOLIATE ORANGE, *PONCIRUS TRIFOLIATA*.**

Bettye Stallings and William R. Bowen, University of Arkansas at Little Rock

ADDITIONS, DELETIONS, AND CORRECTIONS FOR THE ATLAS AND ANNOTATED LIST OF THE VASCULAR PLANTS OF ARKANSAS.

Edwin B. Smith and M. Gwen Barber, University of Arkansas at Fayetteville

AN ANALYSIS OF *HYPERICUM GRAVEOLENS*, *H. MITCHELLIANUM* AND FIELD INTERMEDIATES.

Donald E. Culwell, University of Central Arkansas

RAPHIDES: THEIR MOVEMENT IN CANALS.

J. H. Whitesell, Clarence B. Sinclair, and Joe Meador, University of Arkansas at Little Rock

LEAF TRICHOMES OF THE FAMILY LOGANIACEAE.

Rachel Goss and Clarence B. Sinclair, University of Arkansas at Little Rock

THE VEGETATIVE CELL OF THE CHLOROPHYLLEAN ALGA, *HAEMATOCOCCUS ZIMBABWIENSIS*.

Danna Rosell and William R. Bowen, University of Arkansas at Little Rock

CHLOROPHYLL COMPARISONS BETWEEN THE ETHYLENE-REQUIRING DIAGEOTROPICA MUTANT OF TOMATO AND ITS ISOGENIC PARENT VFN-8.

Timothy J. Mulkey and Forrest E. Lane, University of Arkansas at Fayetteville

ALLELOPATHY VS. COMPETITION AS A MODE OF ACTION OF JOHNSONGRASS ON SOYBEAN.

Briggs W. Skulman and Forrest E. Lane, University of Arkansas at Fayetteville

ENVIRONMENTAL AND ENGINEERING SCIENCES II SECTION

Chairman: John K. Beadles

PRIMARY GROWTH-LIMITING FACTORS IN COMMUNITIES OF *NELUMBO LUTEA* (WILLD.) PERS.

Jeffery H. Rettig, Arkansas State University

EFFECTS OF CROPPING ON GROWTH OF CHANNEL CATFISH (*ICTALURUS PUNCTATUS* RAFINESQUE).

William W. Stephens and John K. Beadles, Arkansas State University

THE EFFECTS OF CHANNELIZATION ON FISH POPULATIONS OF THE CACHE RIVER AND BAYOU DeVIEW, ARKANSAS.

Morris Mauney, Virginia Polytechnic Institute and George L. Harp, Arkansas State University

SEASONAL ABUNDANCE AND HABITAT DISTRIBUTION OF BIRDS IN NORTHEASTERN ARKANSAS.

Earl L. Hanebrink and Alan F. Posey, Arkansas State University

ADDITIONS TO THE STRAWBERRY RIVER ICHTHYOFAUNA.

Henry W. Robison, Southern Arkansas University

THE GOLDEYE IN THE BLACK RIVER.

John K. Beadles, Arkansas State University

ANTHROPOLOGY/ARCHEOLOGY SECTION

Chairman: Charles M. Niquette

APPLICATIONS OF STEREOLOGIC METHODS IN STANDARDIZING INFORMATION ON THE INCLUSIONS OF GROG-TEMPERED PREHISTORIC CERAMICS AT THE TOLTEC SITE, 3Ln42.

Jeyne Bennett, University of Arkansas at Fayetteville

CLOTHING STYLE AND SOCIAL VALUE.

J. M. Brueske, University of Arkansas at Fayetteville

NUTRITIONAL DIFFERENCES AND HUMAN SELECTION OF OAK ACORNS.

Jerry E. Hilliard, University of Arkansas at Fayetteville

ARCHEOLOGICAL INVESTIGATIONS AT THE BURRIS SITE (3CG218).

David H. Jurney, Jr., University of Arkansas at Fayetteville

PROJECTILE POINTS VERSUS PREFORMS: A MODEL FOR THE ASSESSMENT OF PREHISTORIC SITE FUNCTION WITHIN THE OUACHITA MOUNTAINS REGION.

William A. Martin, University of Arkansas at Fayetteville

SOME RECENT TRENDS IN CONTRACT ARCHEOLOGY: A BRIEF OVERVIEW.

Charles M. Niquette, University of Arkansas at Fayetteville

DEER BEHAVIOR AND ETHNOGRAPHIC MAN.

David C. Quin, University of Arkansas at Fayetteville

SELF-PERCEIVED HEALTH AND LIFE OUTLOOK AMONG THE RURAL ELDERLY.

Mary Jo Schneider, University of Arkansas at Fayetteville

CERAMICS AND CLAYS AT TOLTEC INDIAN MOUNDS (3Ln42): A TEST OF X-RAY DIFFRACTION REGIONAL BASIS.

Judith C. Stewart, University of Arkansas at Fayetteville

LIFE SATISFACTION AND AGING: A STATISTICAL MODEL FOR CRAWFORD COUNTY, ARKANSAS.

Michele Sunderland, University of Arkansas at Fayetteville

GEOLOGY SECTION

Chairman: Walter Manger

HYDROGEOLOGIC INVESTIGATION OF A LAND-FILL SITE IN WASHINGTON COUNTY, ARKANSAS.

Albert E. Ogden and Carlos J. Quintana, University of Arkansas at Fayetteville

A PRELIMINARY INVESTIGATION OF THE RURAL-USED AQUIFERS OF BOONE, CARROLL, AND MADISON COUNTIES, ARKANSAS.

Albert E. Ogden, Nancy L. Taylor, and Steve D. Thompson, University of Arkansas at Fayetteville

LITHOSTRATIGRAPHY OF THE BOONE FORMATION (LOWER MISSISSIPPIAN), NORTHWEST ARKANSAS.

Jeffrey L. Liner, University of Arkansas at Fayetteville

REPLACEMENT TEXTURES WITHIN THE ARKANSAS BARITE.

Stephen E. Laney, University of Arkansas at Fayetteville

CALCITIZATION AND DOLOMITIZATION PATTERNS, PITKIN LIMESTONE (UPPER CHESTERIAN), NORTHWEST ARKANSAS.

Dallas W. Greenberg and Walter L. Manger, University of Arkansas at Fayetteville

LITHOSTRATIGRAPHY OF THE CANE HILL MEMBER OF THE HALE FORMATION (TYPE MORROWAN), NORTHWEST ARKANSAS.

Robert T. Liner, University of Arkansas at Fayetteville

LITHOSTRATIGRAPHIC ANALYSIS OF SELECTED SHELF FACIES, PITKIN LIMESTONE (CHESTERIAN), NORTHWEST ARKANSAS.

Richard Mollison, University of Arkansas at Fayetteville

Arkansas Collegiate Academy of Science

Rich Brown
President

Sandra Thompson
Secretary

David Dube
Treasurer

Sponsor: Dr. Glen Good

MINUTES OF THE BUSINESS MEETING, 5 APRIL 1979

Rich Brown, 1978-79 President presiding.
Rich Brown, in opening the meeting, expressed concern for low membership in past years.

Frank Brown was introduced as the 1978-79 president.
It was announced that there would be no meeting on Saturday, April 6.

The Treasurer's Report given by David Dube was as follows:

\$37.40	Previous Balance at last meeting
50.00	Senior Academy Receipts
41.53	1978-79 Debits
45.87	Present Balance

Rich Brown stated that funding for research was available to Collegiate Academy Members; last year \$175.00 was made available to cover expenses for officers and to cover some research expenses of collegiate members.

The floor was opened for nomination of officers, beginning with the office of president-elect. Motions were made and seconded that the following people be nominated:

Sonya Quandt of Harding
Alex Ray of Harding
Clarissa Ply of UAM

After a majority vote, Sonya Quandt was acclaimed president-elect.

Motions were made and seconded that the following be nominated for treasurer:

Pam Ellington of Harding
Steve Stiles of UAM

By a majority vote, Pam Ellington was declared treasurer.

Frank Brown announced that he had no choice for secretary at the present time.

It was brought to the attention of the Collegiate Academy by a member from UAM that not more than two executive offices are to be held by members of the same school simultaneously. (All executive offices at this point belonged to members of Harding College).

Section 11:36 of the Collegiate Academy Constitution was read and was found to be in agreement with the member's statement.

At this point the discussion was reversed to the president, Rich Brown, who determined that the vote for president-elect was invalid.

The floor was reopened for nomination of president-elect.

The following were nominated by a motion and a second to that motion:

Clarissa Ply of UAM
Jane Spradley of Hendrix

After voting, Jane Spradley was acclaimed the new president-elect.

Rich Brown presented a paper on Recombinant DNA.

The meeting was adjourned.

Respectfully Submitted,



Sandra Thompson
Secretary
Arkansas Collegiate Academy
1978-79

ABSTRACTS OF PAPERS PRESENTED BY COLLEGIATE ACADEMY MEMBERS

Editor's Note: Not included in the following abstracts are those of James M. Britton and Carl D. Jeffers, whose papers were accepted for publication and are presented elsewhere. Titles of papers presented by Collegiate Academy members are identified in the preceding Section Programs by*.

SYNTHESIS OF CALLISTEPHIN CHLORIDE.

Johnny E. Brian and Thomas E. Goodwin, Dept. of Chemistry, Hendrix College, Conway, Ark. 72032

The synthesis of callistephin chloride, a naturally occurring plant pigment, has been previously reported in the literature. Work on the preliminary reactions of this synthesis and modifications of them will be discussed. Also discussed will be the reason for synthesis of the compound, its suspected biological activity. The goal of this project is to prepare enough of the compound to allow it to be screened for antitumor properties by the National Cancer Institute.

DEGENERATING AND REGENERATING INDIRECT FLIGHT MUSCLES OF THE RICE WATER WEEVIL *LISSORHOPTRUS ORYZOPHILUS*, KUSCHEL: THEIR COMPARISON AND DESCRIPTION.

Beth Haizlip, Dept. of Entomology, University of Arkansas at Fayetteville, Fayetteville, Ark. 72701

The median dorsal longitudinal and dorso-ventral muscles of the rice water weevil, (*Lissorhoptrus oryzophilus*, Kuschel) undergo degeneration in rice fields, and regeneration occurs after diapause development but before spring emergence. Muscles were found to be in three general states—well-developed, developing, and histolyzing. Developing median dorsal longitudinal and dorso-ventral muscles were found to comprise 5 significant categories of development, whereas in flooded fields they consisted of 3 significant categories. Sections of median dorsal longitudinal muscles in the developing, well-developed, and histolyzing conditions revealed alterations in size and shape of nuclei and changes in fibrillar structure.

A RADIOIMMUNOASSAY FOR PHOSPHOGLUCOSE ISOMERASE AND ITS INITIAL UTILIZATION IN DETECTING CROSS REACTIVE MATERIAL IN VARIANT FORMS OF PHOSPHOGLUCOSE ISOMERASE.

Roy S. Jones, K. Purdy, and Robert W. Gracy, Dept. of Chemistry, Hendrix College, Conway, Ark. 72032, and Dept. of Biochemistry, North Texas State University, Denton, Tex. 76201

A method for isolation, purification, and radiolabeling phosphoglucose isomerase (PGI) was devised to develop a quantitative radioimmunoassay for the detection of enzyme irrespective of its catalytic activity. In four genetic variants of PGI, no difference was observed in the molecular specific activity. In another variant (PGI-Denton), a decreased molecular specific activity was observed which may imply that these samples contain cross reactive material which is not catalytically active.

CHARACTERIZATIONS OF CONVEX SETS.

Lisa M. Orton, Dept. of Mathematics, Hendrix College, Conway, Ark. 72032

A subset C of a metric space X has the *unique nearest-point property* if for every $x \in X$ there exists a unique $y \in C$ nearest to x . T. S. Motzkin (1935) has shown that a nonempty $C \subseteq E^n$ is closed and convex if, and only if, C satisfies the unique nearest-point property. *Theorem 1.* If C is a nonempty, closed, and convex subset of a complete inner product space X , then C satisfies the unique nearest-point property. Suppose C is a nonempty subset of a complete inner product space X such that C has the unique nearest-point property. *Theorem 2.* C is closed. Define $\rho: X \rightarrow \mathbb{R}$ by $\rho(x) = \inf \{ \|x-z\| : z \in C \}$ and define $f: X \rightarrow C$ such that $f(x)$ is the unique nearest-point in C to x . The following characterizations will be shown. *Theorem 3.* C is convex if, and only if, f is non-expansive. *Theorem 4.* C is convex if, and only if, ρ is a convex function.

EXPERIMENTAL PROCEDURE FOR THE DETERMINATION OF TRACE-LEVEL URANIUM IN ROCK AND LIQUID SAMPLES USING ARGON PLASMA SPECTROSCOPY.

Richard A. Roberts and Joe R. Trimm, Dept. of Chemistry, Hendrix College, Conway, Ark. 72032, and General Analytical Laboratory, Fundamental Research Branch, Division of Chemical Development, National Fertilizer Development Center, Tennessee Valley Authority, Muscel Shoals, Ala. 35660

A sample preparation and analysis procedure was developed for the determination of trace-level uranium in solid and liquid samples utilizing an argon plasma spectrometer. Previous procedures using colorimetric methods and atomic absorption had been judged unsatisfactory due to a lack of sensitivity and reproducibility. A sample dissolution procedure, extraction process, optimum concentration range, and matrix effects were studied. The procedure developed proved both accurate and precise down to the 5 parts per million range.

ULTRASTRUCTURAL OBSERVATIONS OF CERTAIN TOPOGRAPHICAL FEATURE OF LARVAE AND PUPAE OF THE YELLOW JACKET WASP, *Vespa squamosa*.

Richard Roller and William R. Bowen, Dept. of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204

Living larvae and pupae were removed from the cells of a subterranean nest of the Common Yellow Jacket Wasp, *Vespa squamosa*. Sufficient numbers were present to allow the identification of several stages in the development of the adult from the pupa and the larva. These specimens were subsequently fixed in Bouin's, dehydrated, critical point dried, coated with gold/palladium and observed with a scanning electron microscope. An initial survey indicated the more interesting features in the development of this wasp at the ultrastructural level included the cuticle, the mandible, and the appendages.

ULTRASTRUCTURAL OBSERVATIONS OF A FLORIDEAN RED ALGA.

Rosemary Rosell and William R. Bowen, Dept. of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204

Aquarium plants (real and artificial) obtained from a pet shop in Arkansas were found to have epiphytic growths of an as yet unidentified floridean red alga. These growths consisted of tufts of bluish-green filaments. Specimens were fixed in glutaraldehyde/osmium tetroxide, dehydrated embedded, and thin-sectioned for observation with transmission electron microscopy. Ultrastructural observations on the floridean pit, the chloroplast, the pyrenoid, and other features of this alga will be reported.

COMPUTER APPLICATIONS IN POPULATION GENETICS.

Cassandra Scrimshire, Dept. of Mathematics, Hendrix College, Conway, Ark. 72032

The author explores the programmability of techniques for finding the number of generations required for a population to change from one frequency of a gene to its equilibrium frequency or some other frequency when taking into consideration such factors as mutation, selection, migration, and inbreeding.

ULTRASTRUCTURAL OBSERVATIONS ON THE PRESENCE OF A FIBER-LIKE INCLUSION IN CERTAIN LEAF CELLS OF THE TRIFOLIATE ORANGE, *PONCIRUS TRIFOLIATA*.

Bettye Stallings and William R. Bowen, Dept. of Biology, University of Arkansas at Little Rock, Little Rock, Ark. 72204

An interesting cellular inclusion, consisting of a cluster of radiating fiber-like structures, was discovered in certain leaf cells of the trifoliolate orange, *Poncirus trifoliata*. The leaves were taken from plants that were undergoing greening after an initial fungal-induced albinism. These inclusions were found to appear first in the nucleus and later in the cytoplasm, including plastids and other organelles. They were never found to occur in the nucleolus, vacuoles, and the cell wall. Their presence in a differentiating xylem element was associated with the presence of a tertiary "wall thickening" in this type of cell. The exact nature of these inclusions has not yet been ascertained. Efforts at elucidating the nature of these inclusions through variations in fixation and staining will be described.

THE KERNEL OF THE LAPLACE TRANSFORM.

David Sutherland, Dept. of Mathematics, Hendrix College, Conway, Ark. 72032

The kernel of the Laplace transform, $\mathcal{L}\{f(t)\} = \int_0^\infty e^{-st} f(t) dt$, is $K(s,t) = e^{-st}$. It is shown that the kernel can be exhibited as the kernel of the morphism \mathcal{L}^{-1} between two multiplicative semigroups, one of which is a semigroup of continuous functions defined on $[0, \infty)$ with the operation being pointwise multiplication and the other is a semigroup of equivalence classes of continuous functions defined on $[0, \infty)$ with the operation being convolution. Intermediate results include the uniqueness of the inverse Laplace for continuous functions on $[0, \infty)$ and demonstration of the Dirac-delta function as the identity for convolution.

UNIFORM LIMITS OF STEP FUNCTIONS.

Agnes L. Tulio, Dept. of Mathematics, Hendrix College, Conway, Ark. 72032

Take C to be the class of all uniform limits of sequences of step functions on $[a,b]$. Studies show that C is a proper subclass of all Riemann integrable functions on the same interval. More significantly, we find that C is precisely the completion of τ where τ is the vector space of all piecewise continuous functions on $[a,b]$ with the supremum norm defined on it.

HIGHER ORDER SYMMETRIC DERIVATIVES.

Gene Weber, Dept. of Mathematics, Hendrix College, Conway, Ark. 72032

Define the first symmetric derivative of f at x by

$$f'_s(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x-h)}{2h}$$

The author will compare the symmetric derivative with the usual derivative. Then a representation of higher order symmetric derivatives will be given. Theorems concerning the symmetric derivative analogous to those proved in calculus for the ordinary derivative will be considered.